

Claims

- 1 1. (original) A method for displaying an image only to an authorized user,
2 comprising:
3 generating a data image;
4 generating a mask image, wherein the mask image is a negation of the
5 data image;
6 selecting the data image or the mask image according to a select signal;
7 and
8 sequentially displaying the selected images on a display.
- 1 2. (original) The method of claim 1 further comprising;
2 opening an optical shutter device when the data image is displayed;
3 shutting the optical shutter device when the mask image is displayed so
4 that only the data image is perceived by the authorized user viewing the display
5 device through the optical shutter device, and a gray image is perceived by an
6 unauthorized user viewing the data and mask images directly, the opening and
7 shutting synchronized in phase and frequency to the select signal.
- 1 3. (original) The method of claim 2 wherein the optical shutter device includes
2 a polarizing lens on either side of a ferro-electric liquid crystal polarization
3 rotator.
- 1 4. (original) The method of claim 2 further comprising:
2 synchronizing the displaying, and the opening and shutting by a wire
3 link.

- 1 5. (original) The method of claim 2 further comprising:
2 synchronizing the displaying, and the opening and shutting by a wireless
3 link.
- 1 6. (original) The method of claim 5 wherein the synchronization is according to
2 a phase of the select signal.
- 1 7. (original) The method of claim 1 wherein each image is a color image, and
2 the negation is done independently for each color channel of the color image.
- 1 8. (original) The method of claim 7 further comprising:
2 gamma-correcting each color channel after the negation.
- 1 9. (original) The method of claim 7 wherein each input pixel of each color
2 image has an intensity in a range from 0 to 255, and each output pixel is
3 determined by:
4
$$\text{output} = 255((\text{input}/255)^{1/\gamma}) + 0.5.$$
- 1 10. (original) The method of claim 1 wherein the select signal is generated by a
2 clock, and further comprising:
3 alternately selecting the data and mask images according to clock cycles.
- 1 11. (original) The method of claim 1 wherein the select signal is generated by a
2 random generator.

1 12. (currently amended) The method of claim 11 wherein the displayed images
2 occur in pairs so that each pair includes ~~the~~ a first image and ~~the~~ a second
3 image in a random order.

1 13. (original) The method of claim 11 wherein the random generator operates
2 according to an internal seed value and a real-time supplied value.

1 14. (currently amended) The method of claim 2 further comprising:
2 generating a first random select signal to select the displayed images;
3 generating a second random select signal to open and shut the optical
4 shutter device; and
5 synchronizing the second ~~random~~ random select signal to the first ~~and~~
6 random select signal.

1 15. (original) The method of claim 1 wherein each data image includes a
2 plurality of pixels, and further comprising:
3 negating each pixel of the data image serially to generate each
4 corresponding pixel of the mask image; and
5 serially selecting each pixel of the data image or the mask image
6 according to a select signal; and
7 sequentially displaying the selected pixels on a display device.

1 16. (original) The method of claim 15 further comprising:
2 opening an optical shutter device when the selected pixel of the data
3 image is displayed;
4 shutting the optical shutter device when the selected pixel of the mask
5 image is displayed so that only the data image is perceived by the authorized

6 user viewing the display device through the optical shutter device, and a gray
7 image is perceived by an unauthorized user viewing the data and mask images
8 directly, the opening and shutting synchronized in phase and frequency to the
9 select signal.

1 17. (original) The method of claim 16 wherein the select signal is generated by
2 a clock, and further comprising:
3 alternately selecting the pixel from the data and the pixel from the mask
4 images according to clock cycles.

1 18. (original) The method of claim 1 wherein the select signal is generated by a
2 random generator.

1 19. (original) The method of claim 1 wherein a plurality of data images are
2 provided in a video, and each data image is sequentially negated to produce the
3 corresponding mask image.

1 20. (original) A method for displaying an image only to an authorized user,
2 comprising:
3 generating a data image;
4 generating a mask image, wherein the mask image is a combination of
5 the data image and a public image;
6 selecting the data image or the mask image according to a select signal;
7 and
8 sequentially displaying the selected images on a display device.

1 21. (original) The method of claim 20 wherein the data image P is scaled and
2 off-set according to $\alpha P + A$, where α and A are first scaling and -offset
3 parameters, and wherein a secret image is scaled and off-set according to β
4 and B , where β and B are second scaling and -offset parameters, and wherein
5 the combining adds the scaled and off-set data and secret images to produce the
6 mask image.

1 22. (original) The method of claim 21 wherein the first and second scaled and
2 off-set parameters are constrained to inequalities $\alpha + \beta \leq 1$, and $\alpha + A \leq B$.

1 23. (original) The method of claim 20 further comprising;
2 opening an optical shutter device when the data image is displayed;
3 shutting the optical shutter device when the mask image is displayed so
4 that only the data image is perceived by the authorized user viewing the display
5 device through the optical shutter device, and a gray image is perceived by an
6 unauthorized user viewing the data and mask images directly, the opening and
7 shutting synchronized in phase and frequency to the select signal.

1 24. (original) The method of claim 20 wherein the select signal is generated by
2 a clock, and further comprising:
3 alternately selecting the data and mask images according to clock cycles.

1 25. (original) An apparatus for displaying an image only to an authorized user,
2 comprising:
3 a video camera generating a data image;

4 an inverter for generating a mask image, wherein the mask image is a
5 negation of the data image;
6 a controller generating a select signal for selecting the data image or the
7 mask image; and
8 a display device for sequentially displaying selected images on a display
9 device.

1 26. (original) The apparatus of claim 25 further comprising:

2 an optical shutter device opened when the data image is displayed and
3 closed when the mask image is displayed so that only the data image is
4 perceived by the authorized user viewing the display device through the optical
5 shutter device, and a gray image is perceived by an unauthorized user viewing
6 the data and mask images directly, the opening and shutting of the optical
7 shutter device synchronized in phase and frequency to the select signal.

1 27. (original) The apparatus of claim 25 wherein the data and mask images are
2 selected periodically.

1 28. (original) The apparatus of claim 25 wherein the data and mask images are
2 selected randomly.

1 29. (currently amended) The apparatus of claim 25 ~~wherein the 25~~-wherein
2 each image includes a plurality of pixels, and wherein each pixel of the data
3 image negated serially.